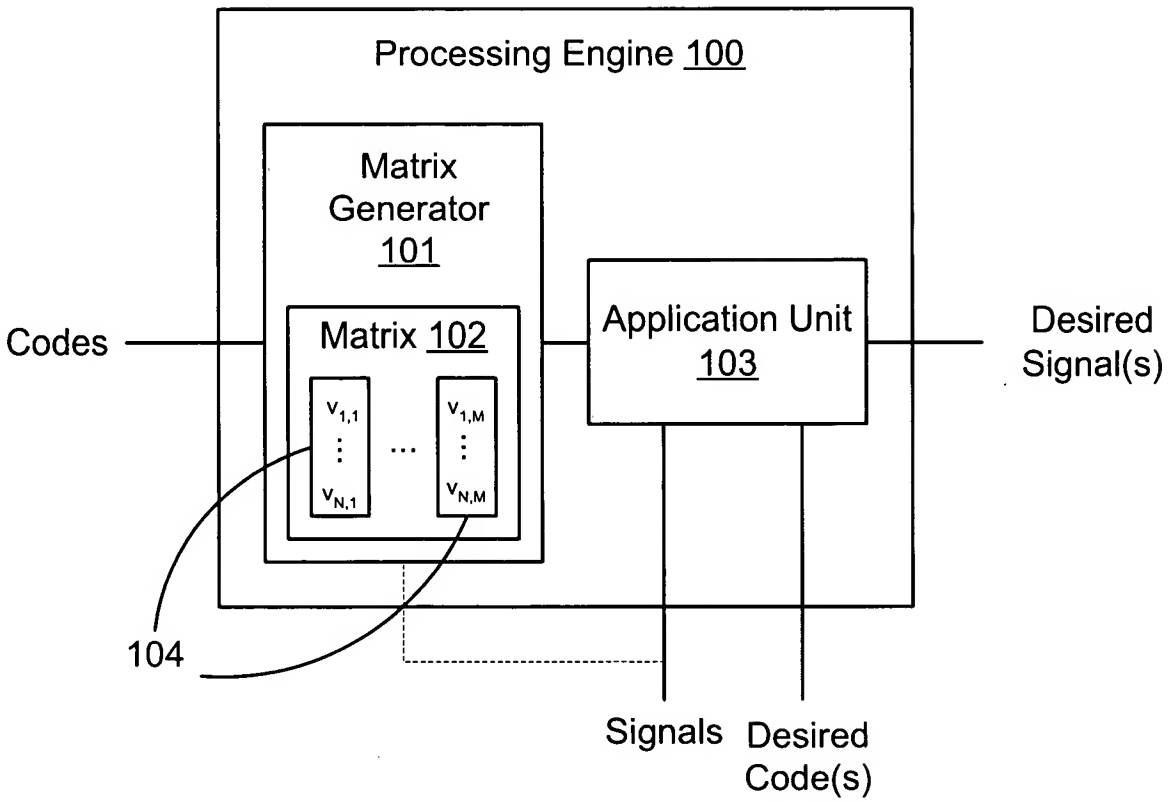

Processing Engine 100
Matrix Generator 101
Matrix 102
$v_{1,1}$
$v_{N,1}$
$v_{1,M}$
$v_{N,M}$
Application Unit 103
Codes
Desired Signal(s)
104
Signals
Desired Code(s)

Figure 1

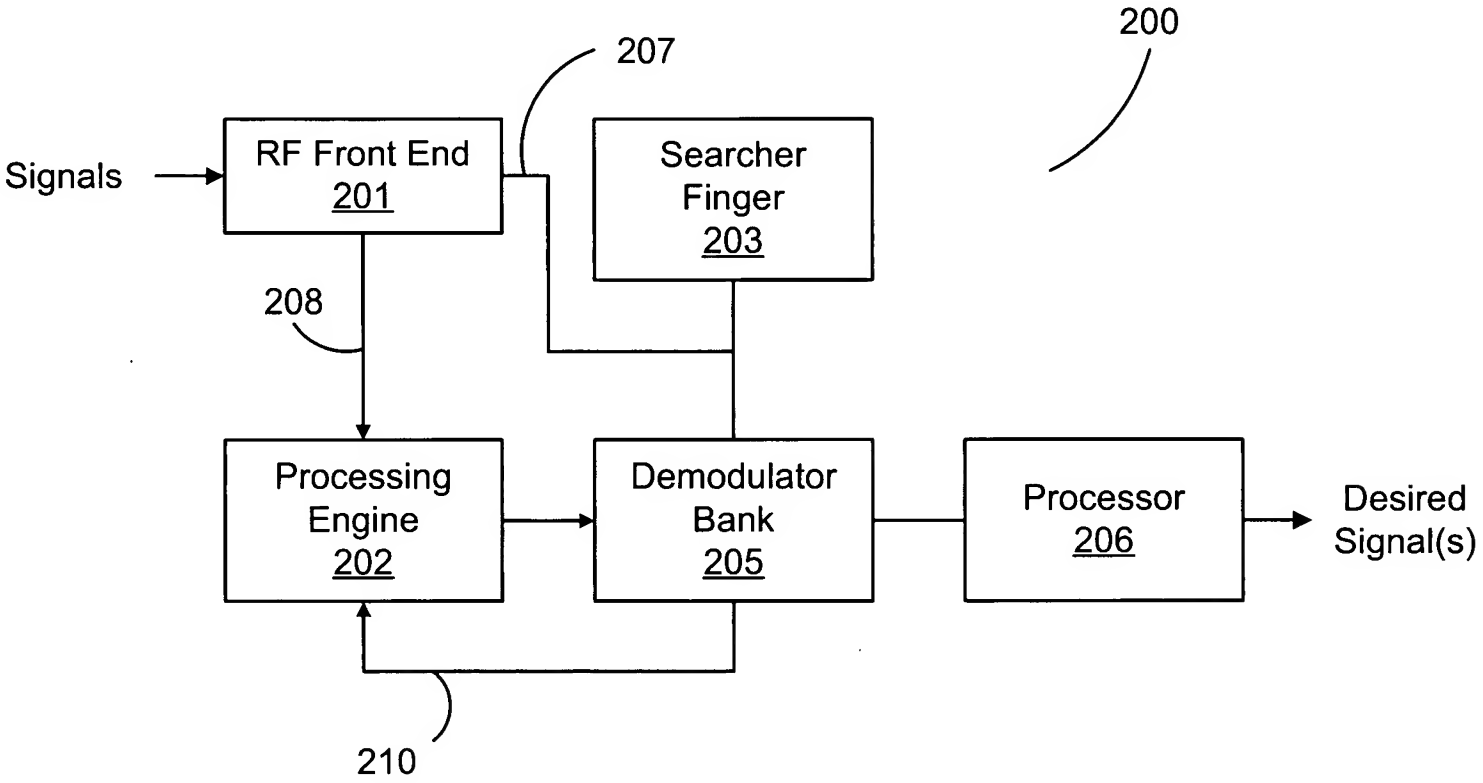

200
207
Signals
RF Front End
201
Searcher
Finger
203
208
Processing
Engine
202
Demodulator
Bank
205
Processor
206
Desired
Signal(s)
210

Figure 2

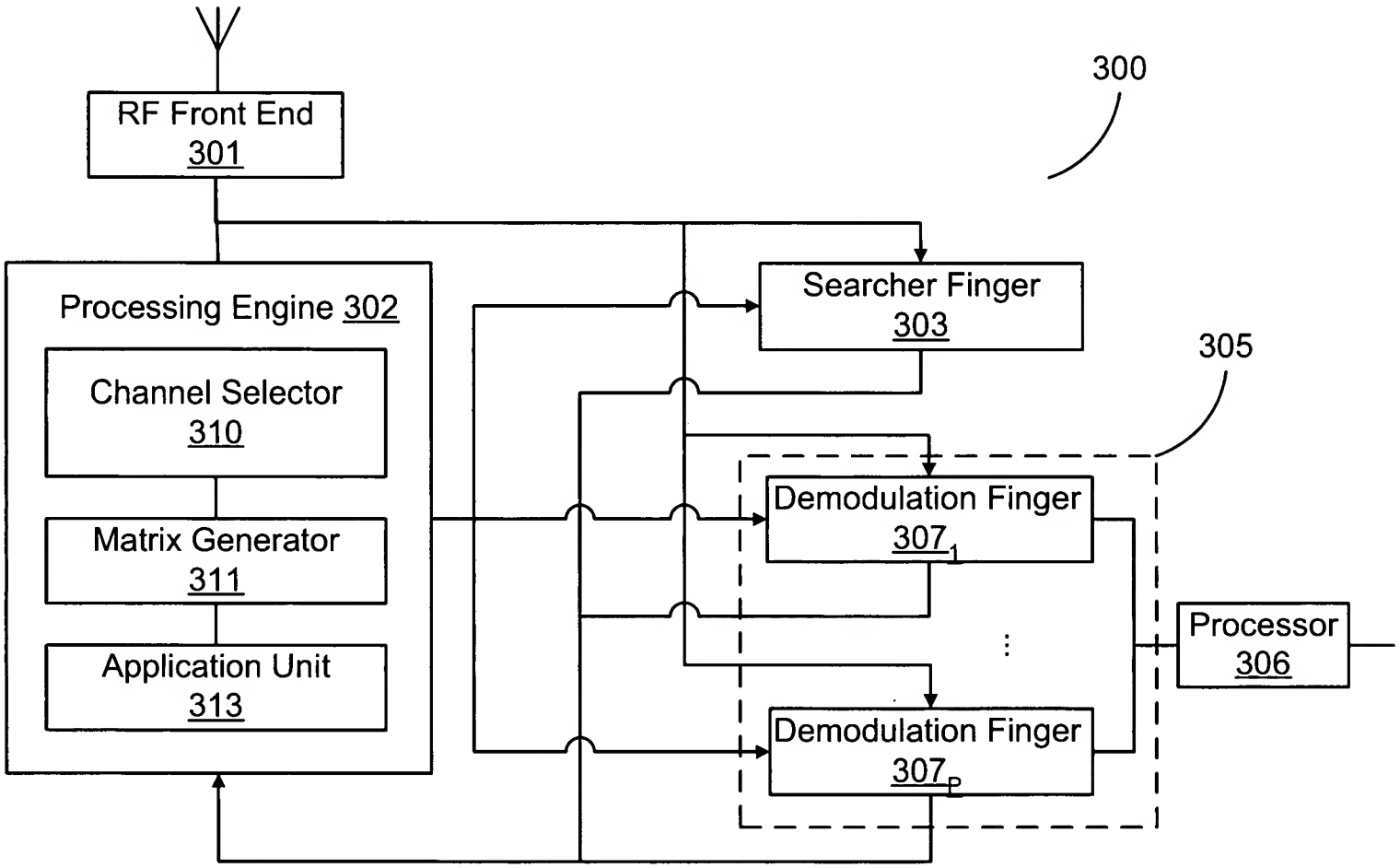

300
RF Front End
301
Processing Engine 302
Channel Selector
310
Matrix Generator
311
Application Unit
313
Searcher Finger
303
305
Demodulation Finger
307_1
Demodulation Finger
307_P
Processor
306

Figure 3

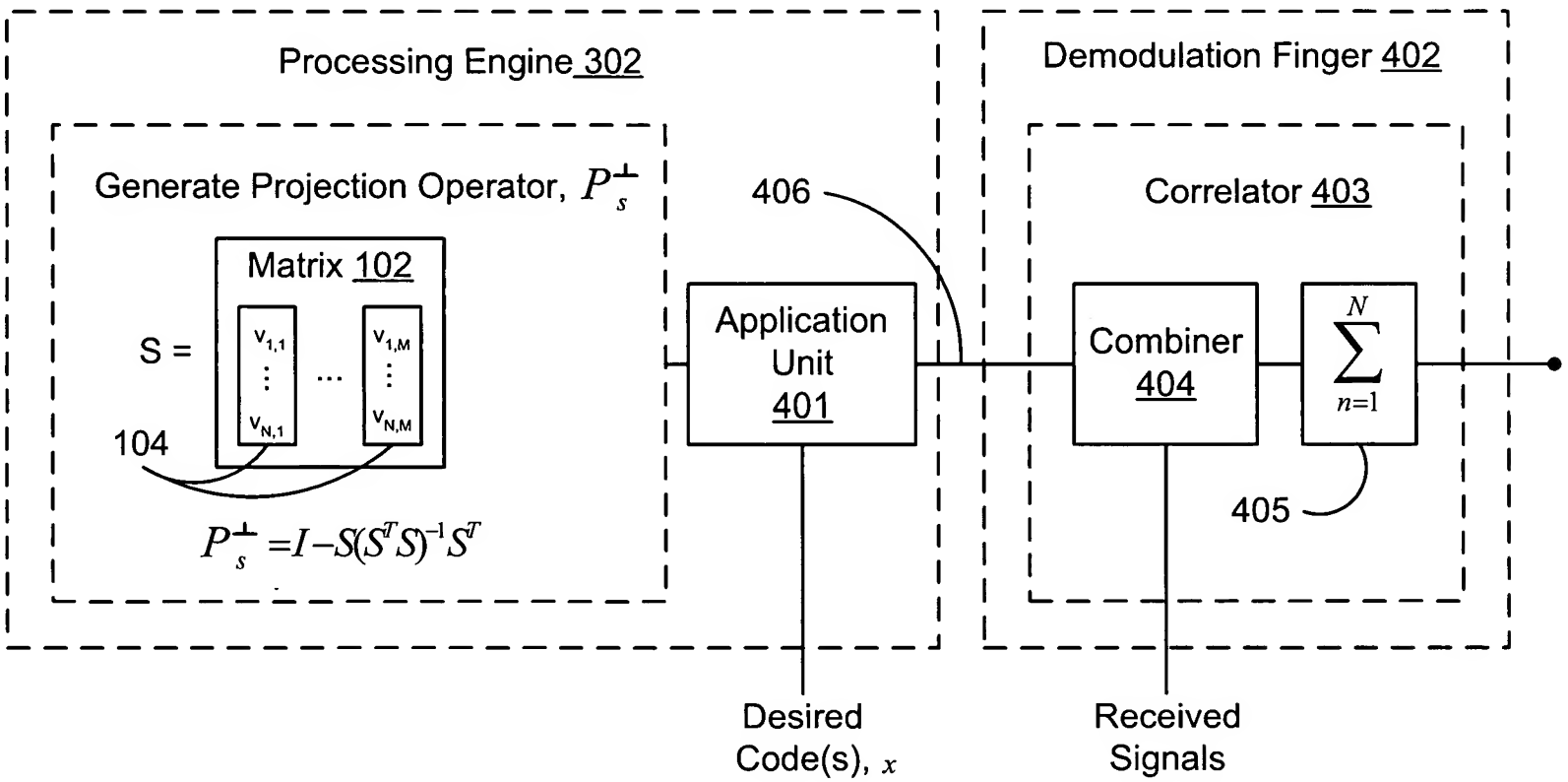
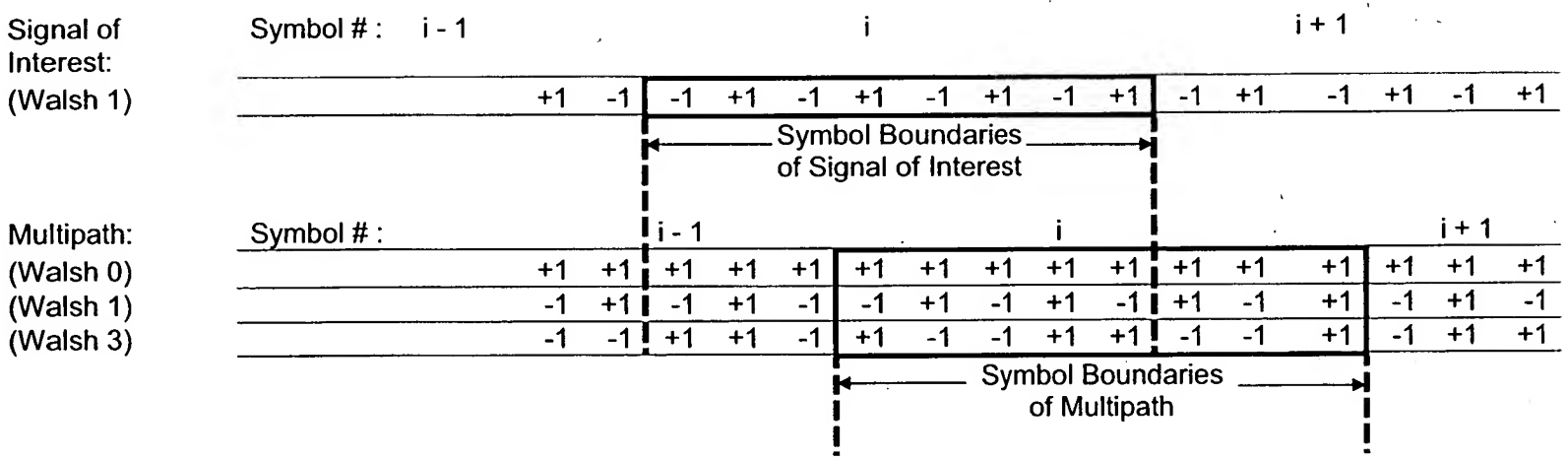

Processing Engine 302
Demodulation Finger 402
Generate Projection Operator, $P_s^{\perp}$
Matrix 102
S =
$v_{1,1}$
$v_{N,1}$
$v_{1,M}$
$v_{N,M}$
104
$P_s^{\perp} = I - S(S^T S)^{-1} S^T$
406
Application Unit 401
Correlator 403
Combiner 404
$\sum_{n=1}^{N}$
405
Desired Code(s), x
Received Signals

Figure 4



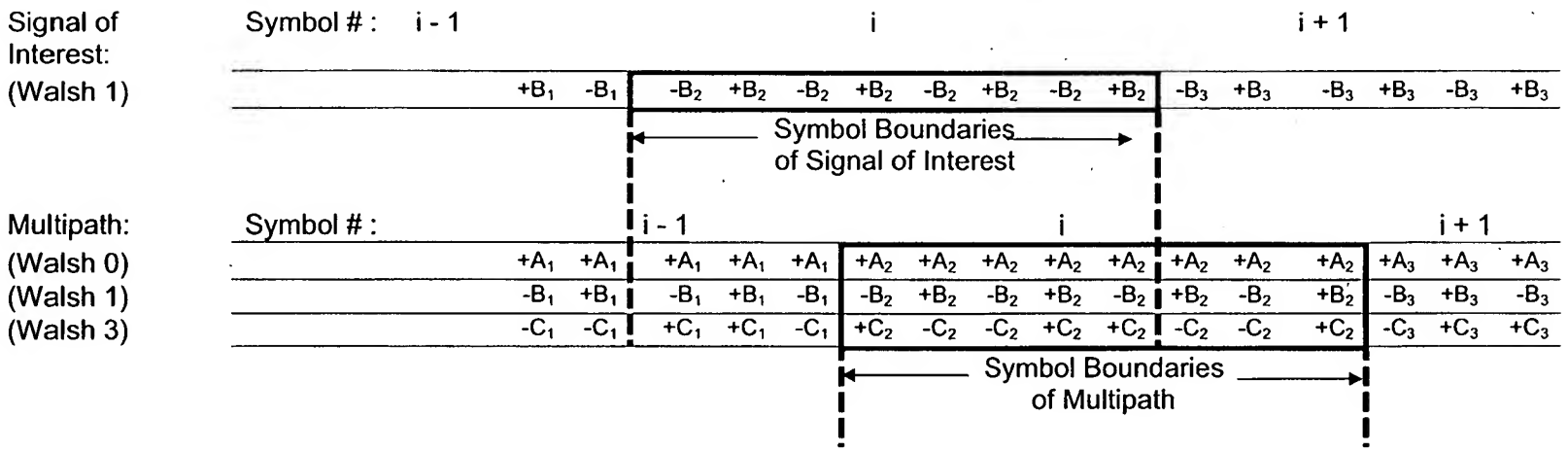
Bit Sequence – Symbols i -1, i, i +1

(Walsh 1):	+1	-1	-1
(Walsh 3):	-1	+1	-1

Interference of Multipath on Signal of Interest

$u_{0,2} = (+1)*u^L_{0,2} + (+1)*u^R_{0,2}$:	+1	+1	+1	+1	+1	+1	+1	+1
$u_{1,2} = (+1)*u^L_{1,2} + (-1)*u^R_{1,2}$:	-1	+1	-1	-1	+1	-1	+1	-1
$u_{3,2} = (-1)*u^L_{3,2} + (+1)*u^R_{3,2}$:	+1	+1	-1	+1	-1	-1	+1	+1

Figure 5



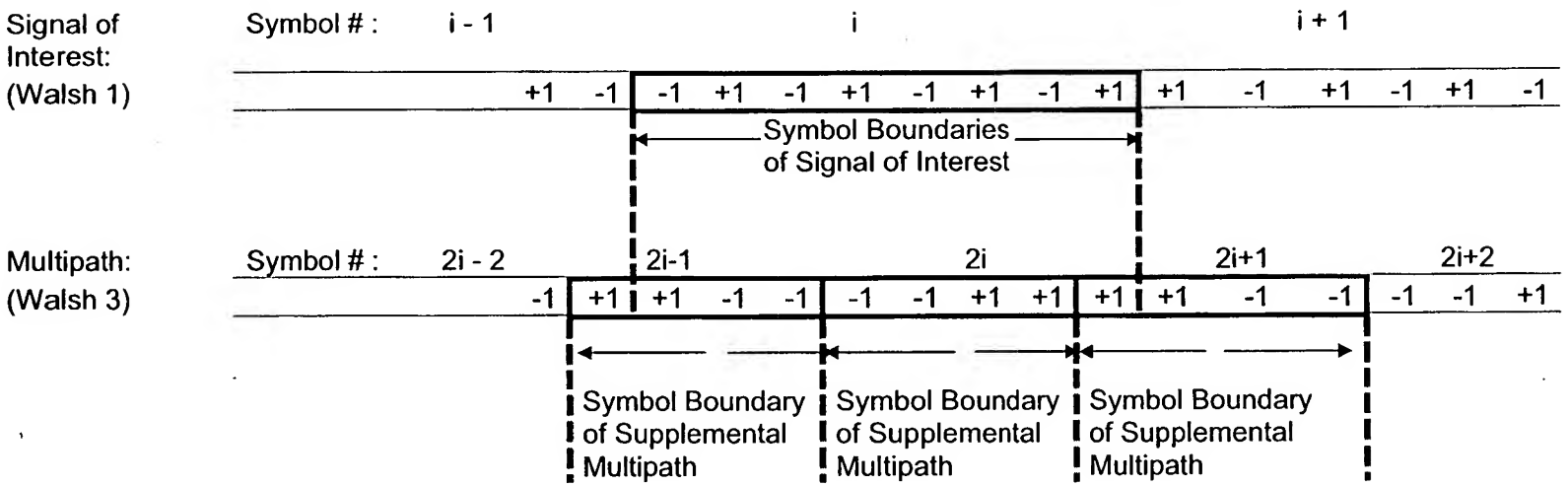
Relative Amplitude (Bit) Sequence – Symbols *i* -1, *i*, *i* +1

(Walsh 0):	$+A_1$	$+A_2$	$+A_3$
(Walsh 1):	$+B_1$	$-B_2$	$-B_3$
(Walsh 3):	$-C_1$	$+C_2$	$-C_3$

Interference of Multipath on Signal of Interest

$u_{0,2} = (+A_1)^*u^L_{0,2} + (+A_2)^*u^R_{0,2}$:	$+ A_1$	$+ A_1$	$+ A_1$	$+ A_2$	$+ A_2$	$+ A_2$	$+ A_2$	$+ A_2$
$u_{1,2} = (+B_1)^*u^L_{1,2} + (-B_2)^*u^R_{1,2}$:	$- B_1$	$+ B_1$	$- B_1$	$- B_2$	$+ B_2$	$- B_2$	$+ B_2$	$- B_2$
$u_{3,2} = (-C_1)^*u^L_{3,2} + (+C_2)^*u^R_{3,2}$:	$+ C_1$	$+ C_1$	$- C_1$	$+ C_2$	$- C_2$	$- C_2$	$+ C_2$	$+ C_2$
$CIV = u_{0,2} + u_{1,2} + u_{3,2}$:	$A_1-B_1-C_1$	$A_1+B_1-C_1$	$A_1-B_1+C_1$	$A_2-B_2+C_2$	$A_2+B_2-C_2$	$A_2-B_2-C_2$	$A_2+B_2+C_2$	$A_2-B_2+C_2$

Figure 6



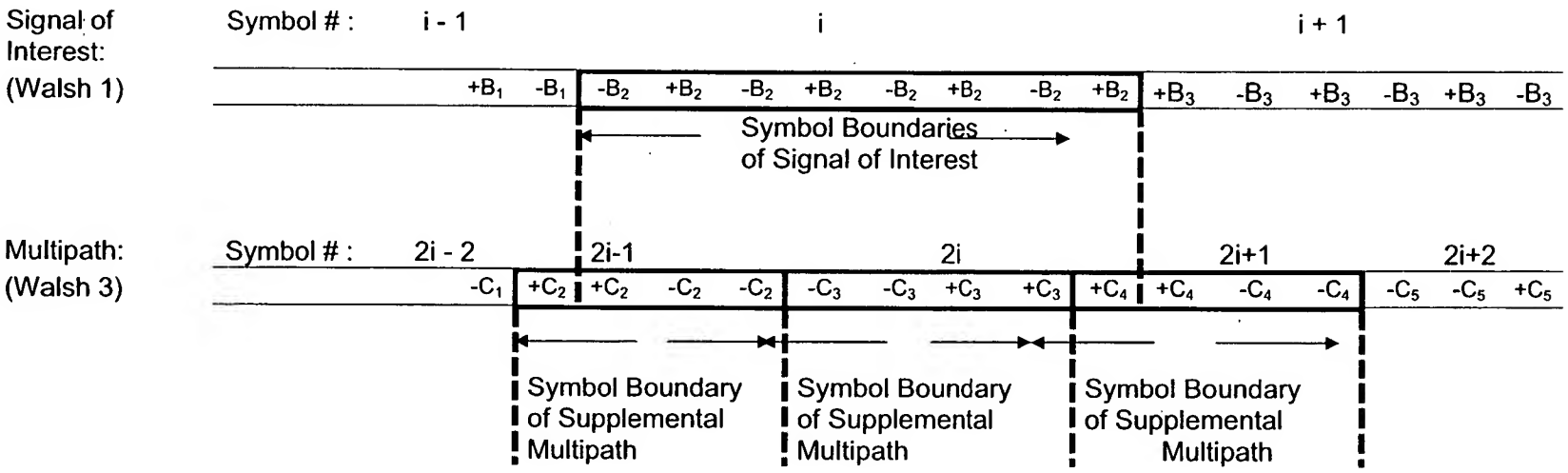
Bit Sequence – Symbols $2i$-2, $2i$-1, $2i$, $2i$-1, $2i$+2

Walsh (3): +1 +1 -1 +1 -1

Interference of Multipath with Supplemental Channels on Signal of Interest

$u_{0,2}$:	+1	+1	+1	+1	+1	+1	+1	+1
$u_{1,2}$:	-1	+1	-1	+1	-1	+1	-1	+1
$u_{3,2} = (+1)^* u^1_{3,2} + (-1)^* u^2_{3,2} + (+1)^* u^3_{3,2}$:	+1	-1	-1	-1	-1	+1	+1	+1

Figure 7



Bit Sequence – Symbols $2i$-2, $2i$-1, $2i$, $2i$-1, $2i$+2

Walsh (3): $+C_1$ $+C_2$ $-C_3$ $+C_4$ $-C_5$

Interference of Multipath with Supplemental Channels on Signal of Interest

$u_{0,2}$:	$+A_1$	$+A_1$	$+A_1$	$+A_2$	$+A_2$	$+A_2$	$+A_2$	$+A_2$
$u_{1,2}$:	$-B_1$	$+B_1$	$-B_1$	$-B_2$	$+B_2$	$-B_2$	$+B_2$	$-B_2$
$u_{3,2} = \Sigma_i(C_{i+1})^* u^i_{3,2}$:	$+C_2$	$-C_2$	$-C_2$	$-C_3$	$-C_3$	$+C_3$	$+C_3$	$+C_4$
CIV:	A_1-B_1+C_2	A_1+B1-C_2	A_1-B_1-C_2	A_2-B_2-C_3	A_2+B_2-C_3	A_2-B_2+C_3	A_2+B_2+C_3	A_2-B_2+C_4

Figure 8

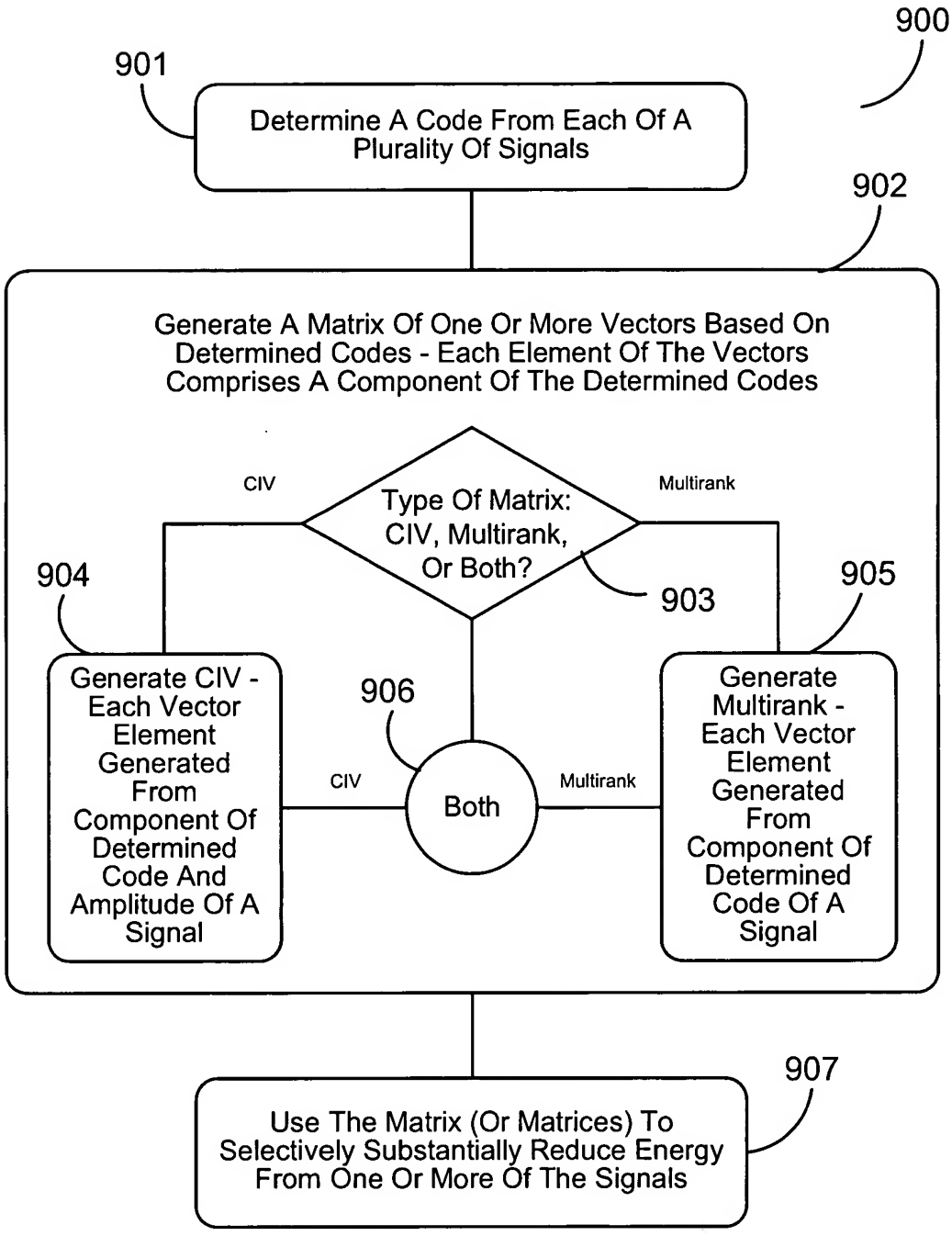

900
901
Determine A Code From Each Of A Plurality Of Signals
902
Generate A Matrix Of One Or More Vectors Based On Determined Codes - Each Element Of The Vectors Comprises A Component Of The Determined Codes
CIV
Type Of Matrix: CIV, Multirank, Or Both?
Multirank
903
904
905
Generate CIV - Each Vector Element Generated From Component Of Determined Code And Amplitude Of A Signal
906
CIV
Both
Multirank
Generate Multirank - Each Vector Element Generated From Component Of Determined Code Of A Signal
907
Use The Matrix (Or Matrices) To Selectively Substantially Reduce Energy From One Or More Of The Signals

Figure 9

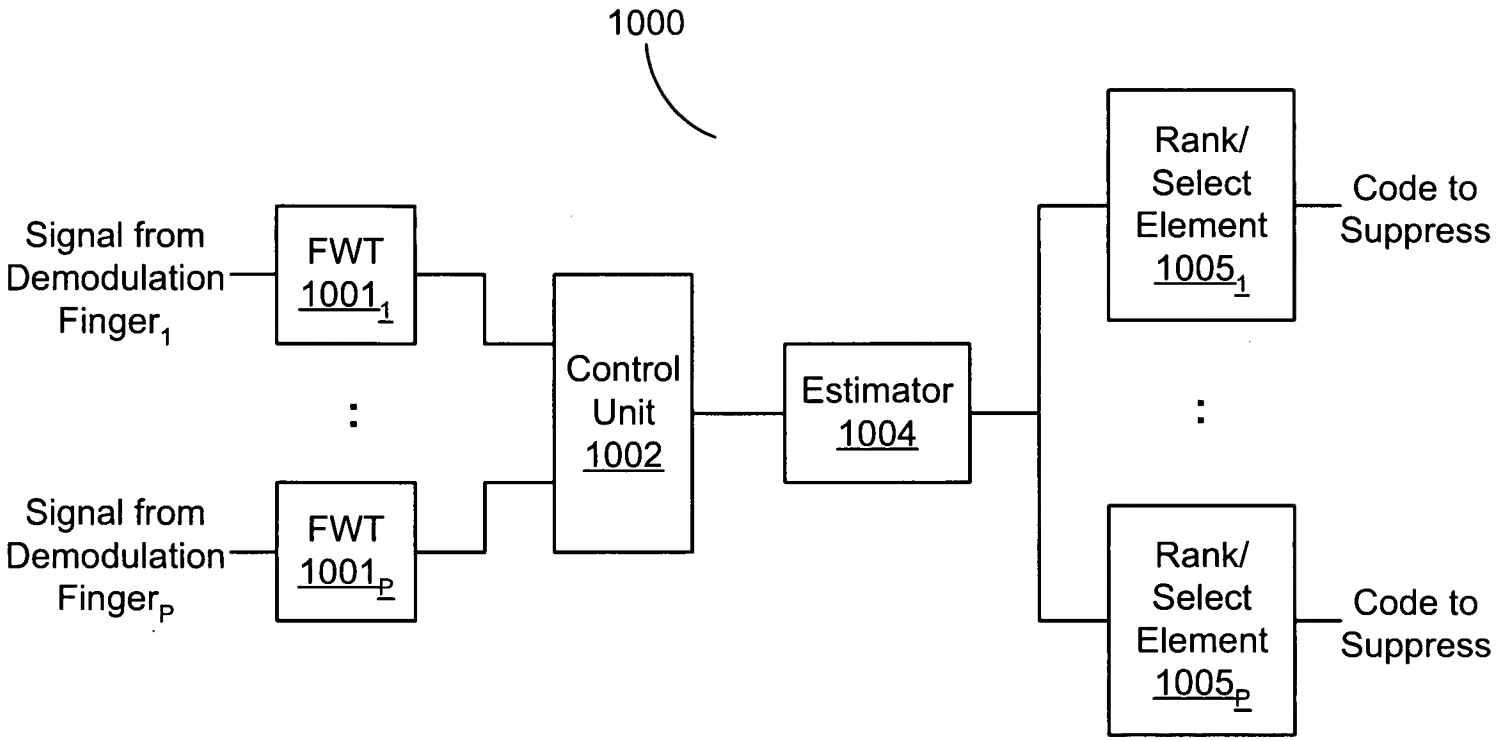

1000
Signal from Demodulation Finger$_1$
FWT 1001$_1$
Signal from Demodulation Finger$_P$
FWT 1001$_P$
Control Unit 1002
Estimator 1004
Rank/ Select Element 1005$_1$
Code to Suppress
Rank/ Select Element 1005$_P$
Code to Suppress

Figure 10

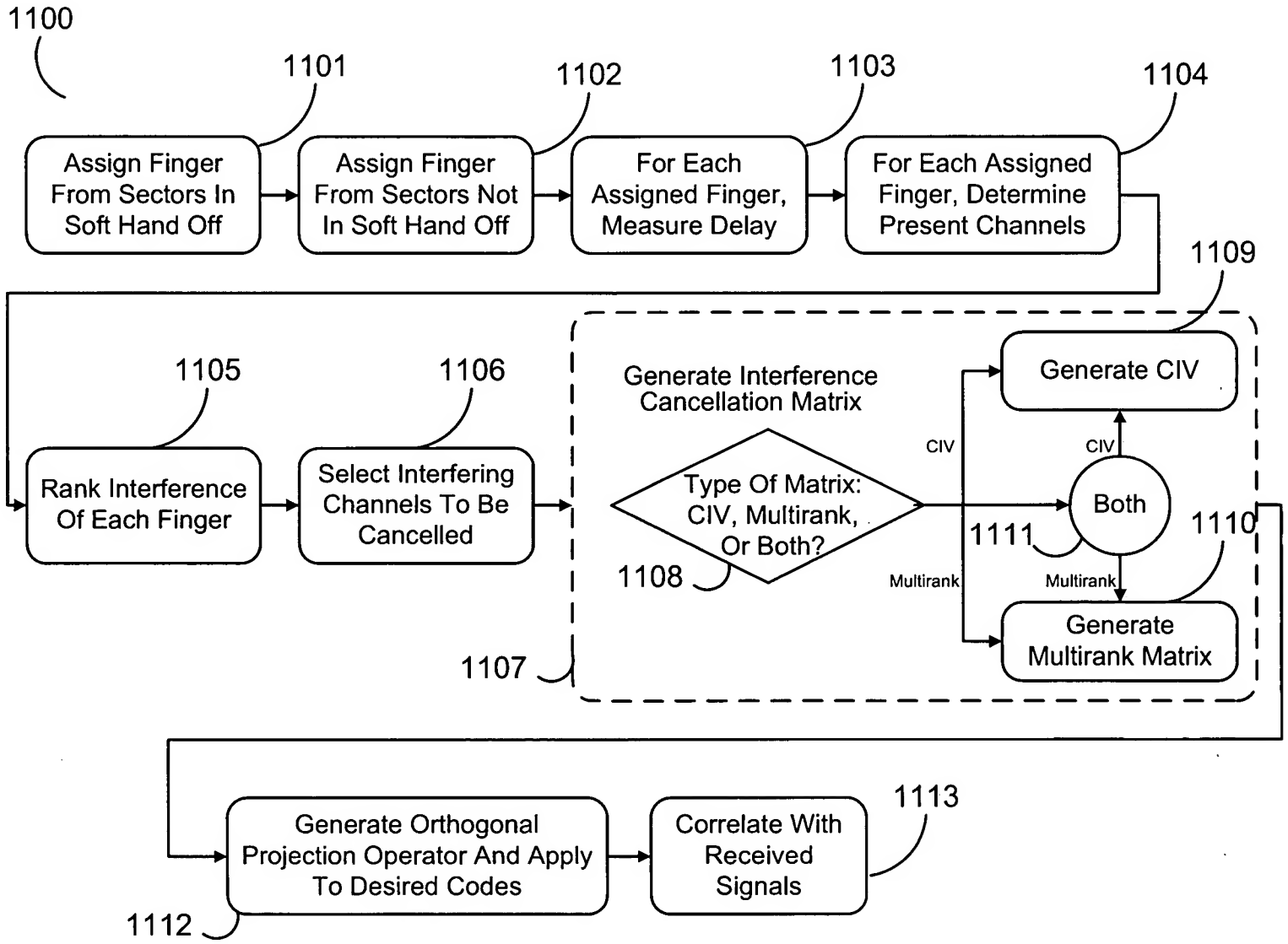

1100
1101
Assign Finger From Sectors In Soft Hand Off
1102
Assign Finger From Sectors Not In Soft Hand Off
1103
For Each Assigned Finger, Measure Delay
1104
For Each Assigned Finger, Determine Present Channels
1109
1105
Rank Interference Of Each Finger
1106
Select Interfering Channels To Be Cancelled
Generate Interference Cancellation Matrix
Type Of Matrix: CIV, Multirank, Or Both?
1108
CIV
Multirank
Generate CIV
CIV
Both
1111
1110
Multirank
Generate Multirank Matrix
1107
Generate Orthogonal Projection Operator And Apply To Desired Codes
1112
Correlate With Received Signals
1113

Figure 11